

# EPower™

## MODEL



## Advanced Power Controller Specification Sheet

EPower™ is the Eurotherm® series of advanced power control units. Combining the advantages of the latest technologies and innovations to produce a truly impressive performance for your process.

### Ratings

The EPower current ratings cover the range from 50 Amps up to 630 Amps (nominal 16 Amps to 630 Amps). Ratings are designed at 40°C, but operation can be defined up to 50°C with associated deratings. The voltage rating can go up to a maximum of 690 volts.

### Predictive Load Management (Patented)

You can reduce your energy costs across your plant by utilising the Predictive Load Management functionality within EPower. This innovative feature provides a better distribution of energy across different loads in your installation by managing the priority and if necessary, load shedding.

### Multi Channel Unit

EPower includes seven different power configurations within one unit, depending on the number of power modules fitted. From single phase configuration to two times two phase control, the unit is perfectly modular and configurable to your process requirements. Multiple zones can be controlled with one unit.

Many more features are available (Log file management, advanced alarm strategy, optional I/O...) to provide you with the best of the technology for your process.

### Display and Remote Display

EPower is fitted with a 4 line x 10 character display with indication of the process values, and diagnostic information, along with an alarm and event message centre. Optionally, the EPower has a 32h8e remote display to allow for the process values and alarm information to be presented front of panel in a clear and unambiguous way. Secure access to the local setpoint is also provided to allow for local control when needed. The remote display, as an indicator, can also provide over temperature policeman functionality removing the need for additional panel instrumentation.

### Communication

Eurotherm has an approach to open communications, offering standard fieldbus networks such as Profibus DP, DeviceNet®, EtherNet/IP and CC-Link communications. The use of Fieldbus makes integration into PLCs and other supervisory systems easy to accomplish. It allows an easier integration into PLCs and other supervisory systems by using the main protocols of the market.

### Configuration

"Quick Start" HMI menus provide an easy and friendly way to quickly configure the unit. With the more complex configurations using the iTools software package.

## General specification

### General Standards

The product is designed and produced to comply with BS EN60947-4-3 (Low voltage switch gear and control gear). Other applicable standards are cited where appropriate.

### Installation Categories

General installation category details for the driver and power units are summarised in the table below.

|                                      | Installation Category | Rated impulse withstand voltage (Uimp) | Rated insulation voltage |
|--------------------------------------|-----------------------|--|--------------------------|
| Communications Standard/Optional I/O | II                    | 0.5kV                                  | 50V                      |
| Driver module power                  | II                    | 2.5kV                                  | 230V                     |
| Relays                               | III                   | 4kV                                    | 230V                     |
| Power Modules (up to 600V)           | III                   | 6kV                                    | 600V                     |
| Power Modules (690V)                 | II                    | 6kV                                    | 690V                     |
| Auxiliary (fan) supply               | II                    | 2.5kV                                  | 230V                     |

### Power (at 40°C)

#### Caution

Although the driver module supply voltage range is 85 to 265V ac, the fans (if any) fitted to the power (thyristor) modules are specified for use at one of 115V ac or 230V ac as specified at time of order. Before plugging the fan harness into the driver module, ensure that the utility supply voltage is suitable for the fan(s). Otherwise, fan life may be shortened or the cooling effect may not be sufficient, either case presenting a possible hazard to the equipment or to the operator.

#### Driver module

Voltage range: 100 to 240V ac (+10% - 15%)

Frequency range: 47 to 63Hz

Power requirement: 60W + Power Module fans  
(15W each for 400A/500A/630A power modules;  
10W each for 160A/250A modules)

#### Power module

Number of modules: Up to four identical units per driver unit

Voltage range: 100 to 600V ac (+10% - 15%) or  
100 to 690V ac (+10% - 15%)  
as specified at time of order

Frequency range: 47 to 63Hz

Nominal current: 16 to 630A depending on power module

Power dissipation: 1.3W per Amp per phase

#### Cooling

Up to and including 100A: Natural convection

Above 100A: Fan cooling. Fans are connected in parallel to driver module connector

Fan supply voltage: 115 or 230V ac, as specified at time of order (see 'Caution' above)

Protection Thyristor drive: RC circuits and high-speed fuses (Type 1)

Pollution degree: Pollution degree 2 (EN60947-1)

Rated short circuit conditional current: 92kA

Utilisation categories AC51: non inductive or slightly inductive loads, resistance furnaces

AC56a: switching of transformers

Duty cycle: Uninterrupted duty/continuous operation

Form designation: Form 4

Short circuit protection

co-ordination type: Type1

Load types:

Single or multiphase control of resistive loads (low/high temperature coefficient and non-ageing/aging types) and transformer primaries. Load voltage/current feedback either internal (standard) or external (option for use with transformer secondaries for example)

## Physical

Dimensions and fixing centres See Fixing Details

Weight kg (lbs):

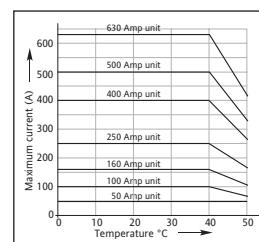
(including 2kg for driver module)

| Current     | 1 phase     | 2 phases    | 3 phases    | 4 phases     |
|-------------|-------------|-------------|-------------|--------------|
| <b>50A</b>  | 6.5 (14.3)  | 11.0 (24.3) | 15.5 (34.2) | 20.0 (44.1)  |
| <b>100A</b> | 6.5 (14.3)  | 11.0 (24.3) | 15.5 (34.2) | 20.0 (44.1)  |
| <b>160A</b> | 6.9 (15.2)  | 11.8 (26.0) | 16.7 (36.8) | 21.6 (47.6)  |
| <b>250A</b> | 7.8 (17.2)  | 13.6 (30.0) | 19.4 (42.8) | 25.2 (55.6)  |
| <b>400A</b> | 11.8 (26.0) | 21.6 (47.6) | 31.4 (69.2) | 41.2 (90.8)  |
| <b>500A</b> | 14.0 (30.9) | 26.0 (57.3) | 38.0 (83.8) | 50.0 (110.2) |
| <b>630A</b> | 14.5 (32.0) | 27.0 (59.5) | 39.5 (87.1) | 52.0 (114.6) |

## Environment

Temperature limits Operating: 0°C to 50°C (derate above 40°C as per accompanying curves)

Storage: -25°C to 70°C



Atmosphere:

Non-explosive, non-corrosive and non-conductive

Humidity limits: 5% to 95% RH (non-condensing)

Altitude (maximum): 1000 metres

Protection: IP10 (EN60529)

External wiring: Must comply with IEC 364

Shock (EN60068-2-29): 10g Pk; 6mS duration; 10 bumps

Vibration (EN60068-2-6): 67-150Hz at 1g

## EMC

Standard:

EN60947-4-3 Emissions class A

This product has been designed for environment A (Industrial). Use of this product in environment B (domestic, commercial and light industrial) may cause unwanted electromagnetic disturbances in which cases the user may be required to take adequate mitigation measures.

Immunity criterion 1 (criterion 3 for voltage dips and short-time interruptions)

## Operator Interface

Display:

4 lines of up to 10 characters each. Display pages can be used to view process variable values and to view and edit the configuration of the unit. (Editing of the configuration is better carried out using configuration software (iTools). In addition to the standard displays, up to four 'custom' pages can be defined which allow bargraph displays, text entry etc.

Character format: 7 high x 5 wide yellow-green LCD dot matrix array

Push buttons: 4 push buttons provide page and item entry and scroll facilities

LED indicators (beacons): 3 indicators (PWR LOC and ALM) are supplied to indicate that power is applied, that Local Control is selected and that there is one or more active alarm respectively

## Standard Inputs/Outputs (SK1)

All figures are with respect to driver module 0V, unless otherwise stated.

Number of inputs/outputs

No of analogue inputs: 2

No of analogue outputs: 1

No of digital inputs/outputs: 2 (each configurable as an input or an output)

10V (Potentiometer) supply: 1

Update rate: Twice the mains frequency applied to power module 1. Defaults to 83.2Hz (12mS) if no power applied to power module1 or if the frequency lies outside the range 47 to 63Hz

Termination: Removable 10-way connector. (5.08 mm pitch)

## Analogue Inputs

Performance: See Tables 1 and 2

Input types: Each input is configurable as one of: 0 to 10V, 1 to 5V, 2 to 10V, 0 to 5V, 0 to 20mA, 4 to 20 mA

Absolute maxima + terminal: ±16V or ±40mA  
- terminal: ±1.5V or ±300mA

| Analogue input: Voltage input performance   |              |                      |
|---|--------------|----------------------|
| Parameter                                   | Typical      | Max/Min              |
| Total voltage working input span (Note 1)   |              | -0.25V to +12.5V     |
| Resolution (noise free) (Note 2)            | 13 bits      | <0.25%               |
| Calibration error (Notes 3 and 4)           | <0.25%       | <0.5%                |
| Linearity error (Note 3)                    |              | ±0.1%                |
| Ambient temperature error (Note 3)          |              | <0.01%/ $^{\circ}$ C |
| Input resistance (+ve terminal to 0V)       |              | >140k $\Omega$       |
| Input resistance (-ve terminal to 0V)       | 150 $\Omega$ |                      |
| Allowable voltage (-ve terminal to 0V)      |              | ±1V                  |
| Series mode rejection of mains interference | 46dB         | >30dB                |
| Common mode dc rejection                    | 46dB         | >40dB                |
| Hardware response time                      | 5ms          |                      |

**Note 1:** w.r.t. to the relevant -ve input

**Note 2:** w.r.t. total working span

**Note 3:** % of effective range (0 to 5V, 0 to 10V)

**Note 4:** After warm up. Ambient = 25 $^{\circ}$ C

Table 1 Analogue input specification table (voltage inputs)

| Analogue input: Current input performance   |              |                      |
|---|--------------|----------------------|
| Parameter                                   | Typical      | Max/Min              |
| Total current working input span            |              | -1mA to +25mA        |
| Resolution (noise free) (Note 1)            | 12 bits      | <0.25%               |
| Calibration error (Notes 2 and 3)           | <0.25%       | <0.5%                |
| Linearity error (Note 2)                    |              | ±0.1%                |
| Ambient temperature error (Note 2)          |              | <0.01%/ $^{\circ}$ C |
| Input resistance (+ve to -ve terminal)      | 235 $\Omega$ |                      |
| Input resistance (-ve terminal to 0V)       | 150 $\Omega$ |                      |
| Allowable voltage (-ve terminal to 0V)      |              | <±1V                 |
| Series mode rejection of mains interference | 46dB         | >30dB                |
| Common mode dc rejection                    | 46dB         | >40dB                |
| Hardware response time                      | 5ms          |                      |

**Note 1:** w.r.t. total working span

**Note 2:** % of effective range (0 to 20mA)

**Note 3:** After warm up. Ambient = 25 $^{\circ}$ C

Table 2 Analogue input specification table (current inputs)

#### Analogue outputs

Performance: See Tables 3 and 4

Output types: Each output is configurable as one of 0 to 10V, 1 to 5V, 2 to 10V, 0 to 5V, 0 to 20mA, 4 to 20 mA

Absolute maxima + terminal: (-0.7V or -300mA) or (+16V or +40mA)  
0V terminal: ±2A

| Analogue output: Voltage output performance                   |           |                      |
|---|-----------|----------------------|
| Parameter   | Typical   | Max/Min              |
| Total voltage working span (within ±20mA (typ.) current span) |           | -0.5V to +12.5V      |
| Short circuit current   |           | <24mA                |
| Resolution (noise free) (Note 1)                              | 12.5 bits | <0.25%               |
| Calibration error (Notes 2 and 3)                             | <0.25%    | <0.5%                |
| Linearity error (Note 2)                                      |           | ≤±0.1%               |
| Ambient temperature error (Note 2)                            |           | <0.01%/ $^{\circ}$ C |
| Minimum load resistance                                       |           | >800 $\Omega$        |
| DC output impedance   |           | <2 $\Omega$          |
| Hardware response time (10% to 90%)                           | 20ms      | <25ms                |

**Note 1:** w.r.t. total working span

**Note 2:** % of effective range (0 to 5V, 0 to 10V)

**Note 3:** After warm up. Ambient = 25 $^{\circ}$ C

Table 3 Analogue output specification table (voltage outputs)

| Analogue output: Current output performance                      |           |                      |
|--|-----------|----------------------|
| Parameter  | Typical   | Max/Min              |
| Total current working span (within -0.3V to +12.5V voltage span) |           | -24mA to +24mA       |
| Open circuit voltage   |           | <16V                 |
| Resolution (noise free) (Note 1)                                 | 12.5 bits | <0.25%               |
| Calibration error (Notes 2 and 3)                                | <0.25%    | <0.5%                |
| Linearity error (Note 2)   |           | ≤±0.1%               |
| Ambient temperature error (Note 2)                               |           | <0.01%/ $^{\circ}$ C |
| Maximum load resistance  |           | <550 $\Omega$        |
| DC Output conductance  |           | <1 $\mu$ A/V         |
| Hardware response time (10% to 90%)                              | 20ms      | <25ms                |

**Note 1:** w.r.t. total working span

**Note 2:** % of effective range (0 to 20mA)

**Note 3:** After warm up. Ambient = 25 $^{\circ}$ C

Table 4 Analogue output specification table (current outputs)

#### 10V supply (Potentiometer supply)

Output voltage: 10.0V ± 0.3V @ 5.5mA

Short circuit o/p current: 15mA max.

Ambient temperature drift: ± 0.012%/ $^{\circ}$ C (typ); ± 0.04%/ $^{\circ}$ C (max.)

Absolute maxima Pin 1: (-0.7V or -300mA) or (+16V or +40mA)

#### Digital I/O

Hardware response time: 100 $\mu$ s

Voltage inputs

Active level (high): 4.4V < Vin < 30V

Non-active level (low): -30V < Vin < +2.3V

Input impedance: 10k $\Omega$

Contact closure input

Source current: 10mA min; 15mA max

Open contact

(non active) resistance: >500 $\Omega$

Closed contact

(active) resistance: <150 $\Omega$

Current source output

Source current: 9mA < Isource < 14mA @ 14V

10mA < Isource < 15mA @ 0V

9mA < Isource < 14mA @ -15V

Open circuit voltage: <14V

Internal pull-down resistance: 10k $\Omega$  (to 0V)

Absolute maxima + terminal: ±30V or ±25mA

- terminal: ±2A

#### Notes:

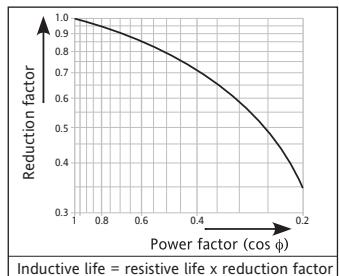
1. Absolute maximum ratings refer to externally applied signals

2. The 10V potentiometer supply is designed to supply two 5k $\Omega$  potentiometers connected in parallel with one another.

3. The maximum current for any 0V terminal is ±2A.

#### Relay Specification

The relays associated with this product have gold plated contacts applicable to 'dry circuit' (low current) use.



Inductive life = resistive life x reduction factor

Contact life Resistive loads: 100,000 operations (de-rate with inductive loads as per figure)

High power use Current: <2A (resistive loads)

Voltage: <264V RMS

Low power use Current: >1mA

Voltage: >1V

Contact configuration: Single pole change-over (One set of Common, Normally Open and Normally Closed contacts)

Termination Relay 1 (standard): 3-way connector on underside of driver unit

Watchdog relay (standard): 3-way connector on underside of driver unit

Relays two to four (option): 12-way option module connector

Absolute max switching capability: <2A at 240V RMS (resistive loads)

**Note:** Normally closed and normally open refer to the relay when the coil is not energised.

#### Optional Input/Output Modules (SK3, SK4, SK5)

Up to three input/output modules can be fitted, each containing the inputs and outputs detailed below. Unless otherwise stated below, the specification for the optional I/O (including relays) is as given above for the standard I/O.

Termination: Removable 12-way (5.08mm pitch) connector per module

Number of modules: Up to 3

Number of inputs: 1 analogue input and 2 digital inputs per module

Number of outputs: 1 analogue output per module

Number of relays: 1 set of common, normally open and normally closed contacts per module

10V potentiometer supply output voltage: 10.0V ± 0.3V at 5.5mA

## Mains Network Measurements

All network measurements are calculated over a full mains cycle, but internally updated every half-cycle. For this reason, power control, current limits and alarms all run at the mains half-cycle rate. The calculations are based on network waveform samples, taken at a rate of 20kHz.

Measurements on each network phase are synchronised to its own phase and if the line voltage cannot be detected, the measurements will stop for that phase. It should be noted that, depending on the network configuration, the phase voltage referred to is one of:

- the line voltage referenced to neutral in four star,
- the line voltage referenced to neutral or another phase for single phase networks or
- the line voltage referenced to the phase applied to the next adjacent power module for three phase star or delta networks.

The parameters below are directly derived from measurements for each phase.

Accuracy (20 to 25°C)

|   |   |
|---|---|
| Line frequency (F):                         | $\pm 0.1\text{Hz}$  |
| Line RMS voltage (Vline):                   | $\pm 0.5\%$ of Nominal Vline  |
| Load RMS voltage (V):                       | $\pm 0.5\%$ of Nominal V for readings<br>$>1\%$ of Nominal V  |
| Thyristor RMS current ( $I_{\text{RMS}}$ ): | $\pm 0.5\%$ of Nominal $I_{\text{RMS}}$ for current readings<br>$>3.3\%$ of Nominal $I_{\text{RMS}}$<br>Unspecified for readings $\leq 3.3\%$ of Nominal $I_{\text{RMS}}$ |
| Note:                                       | For external current feedback this specification does not include errors associated with external current transformers.   |
| Load RMS voltage squared (Vsq):             | $\pm 1\%$ of (Nominal V) $^2$   |
| Thyristor RMS current squared (Isq):        | $\pm 1\%$ of (Nominal I) $^2$   |
| True load power (P):                        | $\pm 1\%$ of (Nominal V) x (Nominal I)  |
| Frequency resolution:                       | 0.01Hz  |
| Measurement resolution:                     | 11 bits of Nominal value (noise free)   |
| Meas. drift with ambient temp:              | <0.02% of reading /°C   |

Further parameters (S, PF, Q, Z, lavg, IsqBurst, IsqMax, Vavg, Vsq Burst, VsqMax and PBurst) are derived from the above, for each network (if relevant). See EPower User Guide Section 6.19.1 (Meas submenu) for further details.

## Communications

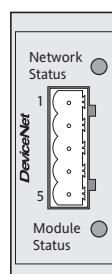


### DeviceNet Connector Pinout

| Pin | Function                         |
|-----|----------------------------------|
| 1   | V- (negative bus supply voltage) |
| 2   | CAN_L                            |
| 3   | Cable shield                     |
| 4   | CAN_H                            |
| 5   | V+ (positive bus supply voltage) |

Notes:

- See DeviceNet specification for power supply specification.
- During startup, an LED test is performed, satisfying the DeviceNet standard.



| Network Status LED Indication |                                 |
|-------------------------------|---------------------------------|
| LED state                     | Interpretation                  |
| Off                           | Off-line or no power            |
| Steady green                  | On-line to one or more units    |
| Flashing green                | On-line - no connections        |
| Steady red                    | Critical link failure           |
| Flashing red                  | 1 or more connections timed out |

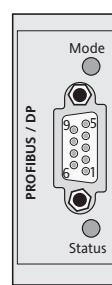
| Module Status LED Indication |                                     |
|------------------------------|-------------------------------------|
| LED state                    | Interpretation                      |
| Off                          | Power                               |
| Steady green                 | Operating normally                  |
| Flashing green               | Missing or incomplete configuration |
| Steady red                   | Unrecoverable fault(s)              |
| Flashing red                 | Recoverable fault(s)                |

### Profibus Connector Pinout

| Pin | Function          | Pin | Function        |
|-----|-------------------|-----|-----------------|
| 9   | N/C               | 5   | Isolated ground |
| 8   | A (RxD -/TxD -)   | 4   | RTS             |
| 7   | N/C               | 3   | B (RxD+ / TxD+) |
| 6   | +5 V (See Note 1) | 2   | N/C             |
|     |                   | 1   | N/C             |

Notes:

- Isolated 5 Volts for termination purposes. Any current drawn from this terminal affects the total power consumption.
- The cable screen should be terminated to the connector housing.



| Operation Mode LED Indication |                              |
|-------------------------------|------------------------------|
| LED state                     | Interpretation               |
| Off                           | Off-line or no power         |
| Steady green                  | On-line, data exchange       |
| Flashing green                | On-line, clear               |
| Red single flash              | Parametrisation error        |
| Red double flash              | Profibus configuration error |

| Status LED Indication |                             |
|-----------------------|-----------------------------|
| LED state             | Interpretation              |
| Off                   | No power or not initialised |
| Steady green          | Initialised                 |
| Flashing green        | Diagnostic event present    |
| Steady red            | Exception error             |

## External Current Transformer

Ratio: Chosen such that the full scale output from the current transformer is 5 Amps

## Communications

|                       |   |
|-----------------------|---|
| Modbus TCP (Ethernet) | Type: 10baseT (IEEE802)   |
|                       | Protocol: Modbus TCP  |
|                       | Connector: RJ45 with indicators (Green = Tx activity; Yellow = Network activity)                  |
| Modbus RTU            | Protocol: Modbus RTU slave  |
|                       | Transmission standard: 3-wire EIA485  |
|                       | Connector: Twin, parallel-wired RJ45, with indicators (Green = Tx activity; Yellow = Rx activity) |
|                       | Isolation (EN60947-4-3): Installation category II, Pollution degree 2                             |
|                       | Terminals to ground: 50V RMS or dc to ground (double isolation)                                   |
| DeviceNet:            | Protocol: DeviceNet   |
|                       | Connector: 5-way with indicators (Network Status and Module Status)                               |
| Profibus:             | Protocol: Profibus DPV1   |
|                       | Connector: 9-way D type with indicators (Operator Mode and Status)                                |
| EtherNet/IP:          | Protocol: EtherNet/IP   |
|                       | Connector: RJ45 with 3 indicators   |
| CC-Link:              | Protocol: CC-Link version 1.1   |
|                       | Connector: 5-way with indicators  |

## Electrical Installation

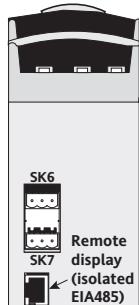


### Drive Unit Connectors

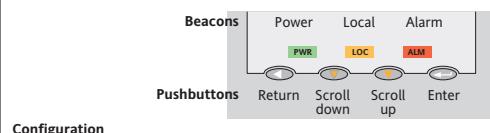


**SK7 Watchdog Relay (De-energised)**

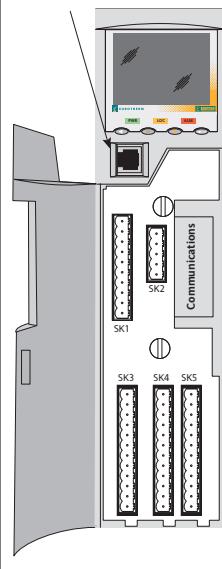
SK7  
Remote display (isolated EIA485)



SK8  
SK9



Configuration Port (EIA232)



| SK1 Standard I/O |                   |
|------------------|-------------------|
| 1                | +10 Volts out     |
| 2                | Analogue i/p 1 +  |
| 3                | Analogue i/p 1 -  |
| 4                | Analogue i/p 2 +  |
| 5                | Analogue i/p 2 -  |
| 6                | Analogue o/p 1 +  |
| 7                | Analogue o/p 1 0V |
| 8                | Digital i/o 1+    |
| 9                | Digital i/o 2+    |
| 10               | Digital i/o 0V    |

| SK2 Predictive Load Management Option |              |
|---------------------------------------|--------------|
| 1                                     | Terminator A |
| 2                                     | Low          |
| 3                                     | Shield       |
| 4                                     | High         |
| 5                                     | Terminator B |

**Supply in**  
SK8 N L  
SK9 N L E Supply output for power module fan(s)

| SK3 Optional I/O 1 |                   |
|--------------------|-------------------|
| 1                  | +10 Volts out     |
| 2                  | Analogue i/p 3 +  |
| 3                  | Analogue i/p 3 -  |
| 4                  | Analogue o/p 2 +  |
| 5                  | Analogue o/p 2 0V |
| 6                  | Digital i/p 3 +   |
| 7                  | Digital i/p 4 +   |
| 8                  | Digital 0V        |
| 9                  | Not used          |
| 10                 | Relay 2 NO (24)   |
| 11                 | Relay 2 Com (21)  |
| 12                 | Relay 2 NC (22)   |

| SK4 Optional I/O 2 |                   |
|--------------------|-------------------|
| 1                  | +10 Volts out     |
| 2                  | Analogue i/p 5 +  |
| 3                  | Analogue i/p 4 -  |
| 4                  | Analogue o/p 3 +  |
| 5                  | Analogue o/p 3 0V |
| 6                  | Digital i/p 5 +   |
| 7                  | Digital i/p 6 +   |
| 8                  | Digital 0V        |
| 9                  | Not used          |
| 10                 | Relay 3 NO (34)   |
| 11                 | Relay 3 Com (31)  |
| 12                 | Relay 3 NC (32)   |

| SK5 Optional I/O 3 |                   |
|--------------------|-------------------|
| 1                  | +10 Volts out     |
| 2                  | Analogue i/p 5 +  |
| 3                  | Analogue i/p 4 -  |
| 4                  | Analogue o/p 4 +  |
| 5                  | Analogue o/p 4 0V |
| 6                  | Digital i/p 7 +   |
| 7                  | Digital i/p 8 +   |
| 8                  | Digital 0V        |
| 9                  | Not used          |
| 10                 | Relay 4 NO (44)   |
| 11                 | Relay 4 Com (41)  |
| 12                 | Relay 4 NC (42)   |

Polarising pins:  
Fixed connector: pins 1 and 2;  
Mating connector: pin 3

Polarising pins:  
Fixed connector: pins 2 and 3;  
Mating connector: pin 1

Polarising pins:  
Fixed connector: pins 1 and 3;  
Mating connector: pin 2

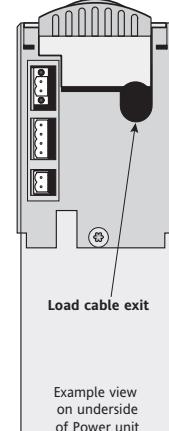
### Power Unit Connectors

#### External feedback connections (optional)

Load current I1 I2

Load Voltage V1 V2

Neutral/phase reference (either pin)



#### External Feedback Connector Pinout and Polarising Details

|                                   | Module 1 | Module 2 | Module 3 | Module 4 |
|-----------------------------------|----------|----------|----------|----------|
| Current feedback connector        | I2       | I1       | I1 + I2  | None     |
| Voltage feedback connector        | V1       | V2       | V1 + V2  | None     |
| Neutral/phase reference connector |          |          |          |          |

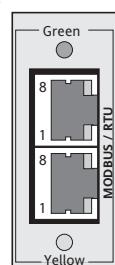
|   | Max Load current | 50A        | 100A        | 160A        | 250A        | 400A      | 500A      | 630A |
|---|------------------|------------|-------------|-------------|-------------|-----------|-----------|------|
| Terminal Size                                   | M8               | M8         | M8          | M10         | M12         | 2 x M12   | 2 x M12   |      |
| Min cable cross-selection mm <sup>2</sup>       | 35               | 35         | 70          | 120         | 240         | 2 x 150   | 2 x 185   |      |
| AWG/Kcmil                                       | 2                | 2          | 00          | 250         | 500         | 2 x 300   | 2 x 350   |      |
| Recommended Torque setting Nm (ft lb)           | 12.5 (9.2)       | 12.5 (9.2) | 12.5 (18.4) | 25 (21.2)   | 28.8 (22.1) | 30 (22.1) | 30 (18.4) |      |
| Earth terminal size                             | M6               | M6         | M6          | M8          | M10         | M12       | M12       |      |
| Min earth cable cross-selection mm <sup>2</sup> | 25               | 25         | 35          | 70          | 120         | 150       | 185       |      |
| AWG/Kcmil                                       | 4                | 4          | 2           | 00          | 250         | 300       | 350       |      |
| Recommended Torque setting Nm (ft lb)           | 5 (3.7)          | 5 (3.7)    | 5 (9.2)     | 12.5 (11.1) | 15 (18.4)   | 25 (18.4) | 25 (18.4) |      |

### Modbus RTU Pinout

| Pin | 3-wire      |
|-----|-------------|
| 8   | Reserved    |
| 7   | Reserved    |
| 6   | N/C         |
| 5   | N/C         |
| 4   | N/C         |
| 3   | Isolated 0V |
| 2   | A           |
| 1   | B           |

Internal connections:  
Pin 1 to 5V via 100k<sup>Ω</sup>  
Pin 2 to 0V via 100k<sup>Ω</sup>

LEDs:  
Green = Tx activity  
Yellow = Rx activity

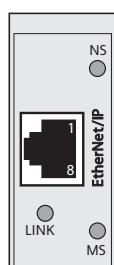


### EtherNet/IP Connector Pinout

| Pin | Function |
|-----|----------|
| 1   | Tx       |
| 2   | Tx-      |
| 3   | Rx+      |
| 4   | N/C      |
| 5   | N/C      |
| 6   | Rx-      |
| 7   | N/C      |
| 8   | N/C      |

| LINK LED Indication |
|---------------------|
| LED state           |
| Interpretation      |

Off  
Steady green  
Flashing green  
Flickering green  
Activity



#### NS (Network Status) LED Indication

| LED state      | Interpretation  |
|----------------|---|
| Off            | No power or no IP address                                       |
| Steady green   | On-line, one or more connections established (CIP class 1 or 3) |
| Flashing green | On-line, no connections established                             |
| Steady red     | Duplicate IP address, FATAL error                               |
| Flashing red   | One or more connections timed out (CIP class 1 or 3)            |

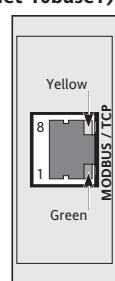
#### MS (Module Status) LED Indication

| LED state      | Interpretation                                  |
|----------------|---|
| Off            | No power  |
| Steady green   | Controlled by a scanner in Run state            |
| Flashing green | Not configuration or scanner in idle state      |
| Steady red     | Major fault (Exception-state, FATAL error etc.) |
| Flashing red   | Recoverable fault(s)                            |

### Modbus TCP (Ethernet 10baseT) Pinout

| Pin | Function |
|-----|----------|
| 8   | N/C      |
| 7   | N/C      |
| 6   | Rx-      |
| 5   | N/C      |
| 4   | N/C      |
| 3   | Rx+      |
| 2   | Tx-      |
| 1   | Tx       |

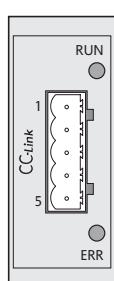
LEDs:  
Green = Tx activity  
Yellow = Network activity



### CC-Link Connector Pinout

| Pin | Function   |
|-----|--|
| 1   | DA (Rx+/Tx+) 110R, 1/2W, 5% across pins 1 and 2 of first and last connectors |
| 2   | DB (Rx-/Tx-) _____   |
| 3   | DG (Signal ground) _____   |
| 4   | SLD (Cable Shield) _____ SLD and FG connected internally                     |
| 5   | FG (Protective Ground) _____   |

- Notes:
1. A 110 Ohm ( $\pm 5\%$  1/2 watt) terminating resistor should be connected across pins 1 and 2 of the transmission line.
  2. The cable shield should be connected to pin 4 of each CC-Link connector.
  3. The shield and Protective earth terminals (pins 4 and 5) are internally connected.



#### 'RUN' LED Indication

| LED state | Interpretation                                     |
|-----------|--|
| Off       | No network participation timeout status (no power) |
| Green     | Participating, normal operation                    |
| Red       | Major fault (FATAL error)                          |

#### 'ERR' LED Indication

| LED state      | Interpretation  |
|----------------|---|
| Off            | No error detected (no power)                          |
| Steady red     | Major fault (Exception or FATAL event)                |
| Flickering red | CRC Error (temporary flickering)                      |
| Flashing red   | Station number or Baud rate has changed since startup |

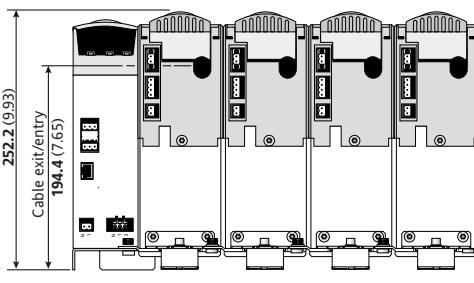
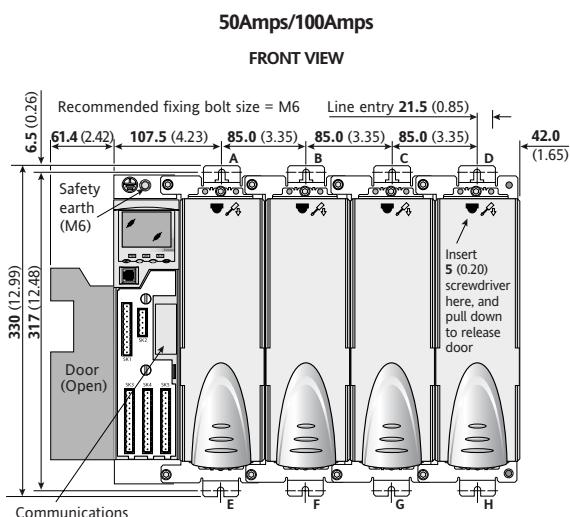
## 50Amps/100Amps/160Amps/250Amps Fixing Details

**Note:** Units are shown with individual mounting brackets. Multi-phase units come supplied with 2, 3 or 4 phase brackets as appropriate. See table below for details.

Dimension mm (inches)

| 50/100/160/250 AMPS |  | Overall Widths |               |               |               |
|---------------------|--|----------------|---------------|---------------|---------------|
| No of phases        |  | 1              | 2             | 3             | 4             |
| Door closed         |  | 149.5 (5.39)   | 234.5 (9.23)  | 319.5 (12.58) | 404.5 (15.93) |
| Door open           |  | 211.0 (8.31)   | 296.0 (11.65) | 381.0 (15.00) | 466.0 (18.35) |

| Bracket | Upper           | Lower         |
|---------|-----------------|---------------|
| 2-phase | Use A & B       | Use E & F     |
| 3-phase | Use A, B & C    | Use E, F & G  |
| 4-phase | Use A, B, C & D | Use E, FG & H |



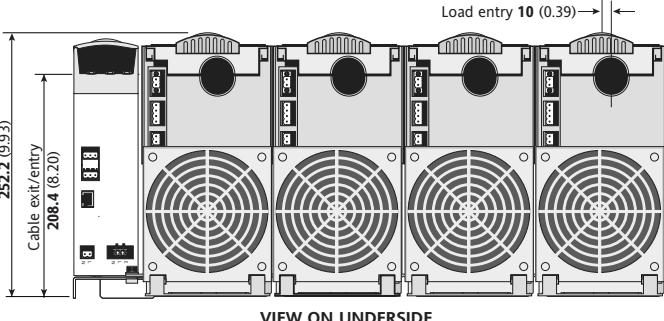
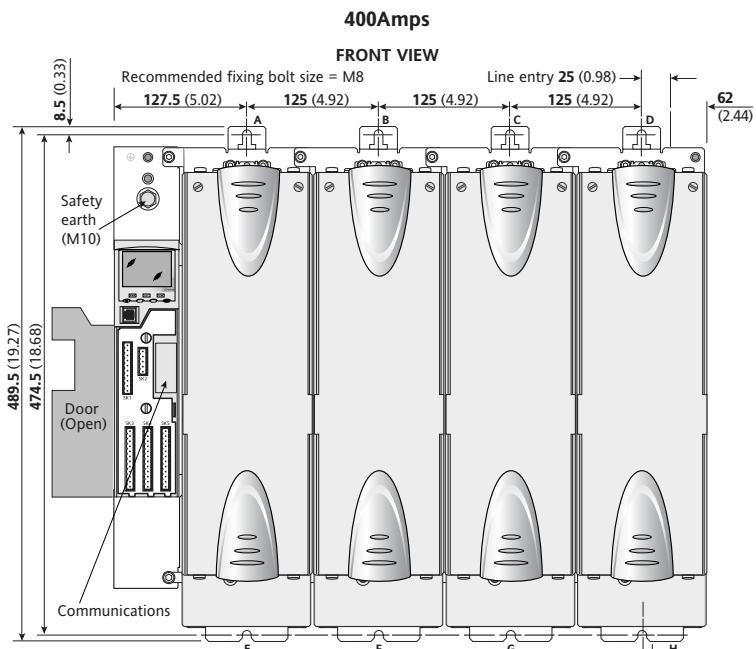
## 400Amps/500Amps/630Amps Fixing Details

**Note:** Units are shown with individual mounting brackets. Multi-phase units come supplied with 2, 3 or 4 phase brackets as appropriate. See table below for details.

Dimension mm (inches)

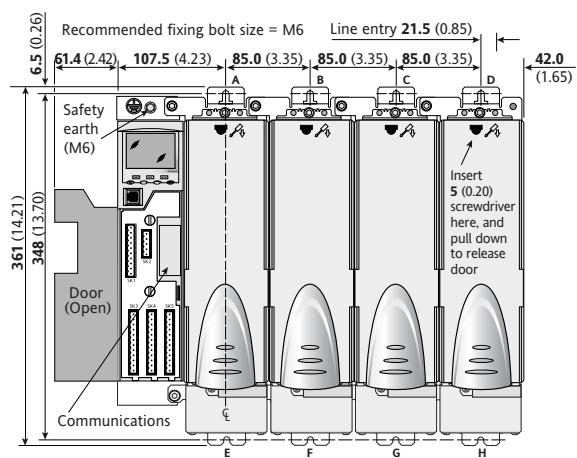
| 400/500/630AMPS |  | Overall Widths |               |               |               |
|-----------------|--|----------------|---------------|---------------|---------------|
| No of phases    |  | 1              | 2             | 3             | 4             |
| Door closed     |  | 189.5 (7.46)   | 314.5 (12.38) | 439.5 (17.30) | 564.5 (22.22) |
| Door open       |  | 251.0 (9.88)   | 376.0 (14.80) | 501.0 (19.72) | 626.0 (24.65) |

| Bracket | Upper           | Lower         |
|---------|-----------------|---------------|
| 2-phase | Use A & B       | Use E & F     |
| 3-phase | Use A, B & C    | Use E, F & G  |
| 4-phase | Use A, B, C & D | Use E, FG & H |

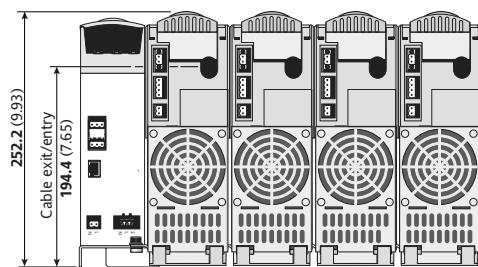
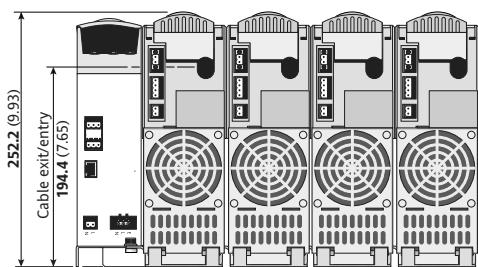
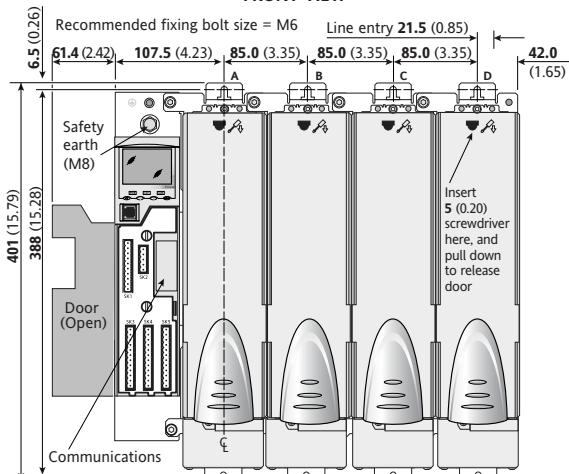


**160Amps**

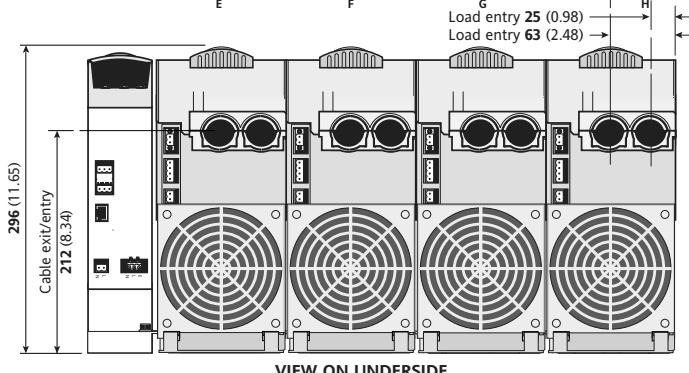
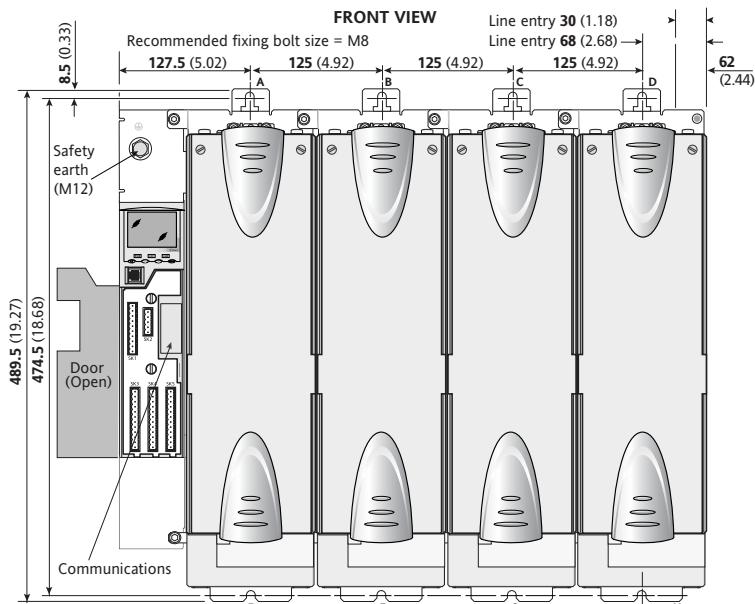
## FRONT VIEW

**250Amps**

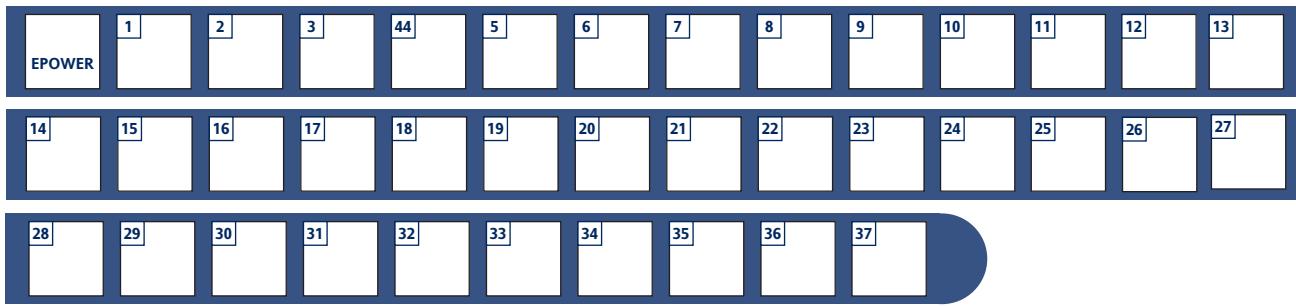
## FRONT VIEW

**500Amps/630Amps**

## FRONT VIEW



## Order codes



The code is divided in three sections:

- 1 Hardware, which defines the type, number and size of the unit and/or the modules.
- 2 Optional hardware and software functions.
- 3 QuickStart which is intend to configure the unit for maximum 60 to 80% of the application (single unit in 1, 2 or 3 legs configuration)

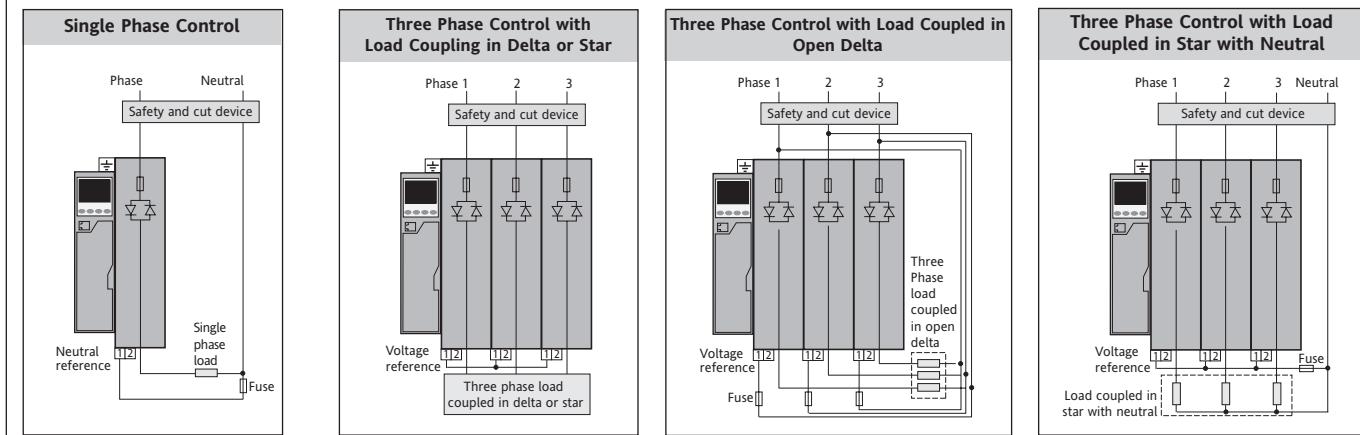
The code can then be either "Short" and include only the main hardware fields or "medium" and combine the hardware + the optional fields, or finally "Long" with the additional quick start code at the end.

| Basic Product           |                    | 2 Voltage               |  | 8 Communications Protocol                |                     | 14 Remote Panel     |  |
|-------------------------|--------------------|-------------------------|--|--|---------------------|---------------------|--|
| EPOWER Power Controller |                    | 600V 100V to 600V       |  | XX No optional fieldbus communication    |                     | XX None             |  |
| 1                       | Phase/Amps         | 690V 100V to 690V       |  | Y2 2-wire 485 Modbus (RJ45 connector)    | 32h8e English       | 32FRA 32h8e French  |  |
| 1PH-50A                 | 1 Phase unit 50A   | XXX For Driver mod only |  | PB Profibus-DPV1 (with D type connector) | 32GER 32h8e German  | 32ITA 32h8e Italian |  |
| 1PH-100A                | 1 Phase unit 100A  |                         |  | ET Modbus-TCP                            | 32SPA 32h8e Spanish |                     |  |
| 1PH-160A                | 1 Phase unit 160A  |                         |  | DN DeviceNet                             |                     |                     |  |
| 1PH-250A                | 1 Phase unit 250A  |                         |  | IP Ethernet/IP                           |                     |                     |  |
| 1PH-400A                | 1 Phase unit 400A  |                         |  | CC CC-Link                               |                     |                     |  |
| 1PH-500A                | 1 Phase unit 500A  |                         |  |  |                     |                     |  |
| 1PH-630A                | 1 Phase unit 630A  |                         |  |  |                     |                     |  |
| 2PH-50A                 | 2 Phase unit 50A   |                         |  |  |                     |                     |  |
| 2PH-100A                | 2 Phase unit 100A  |                         |  |  |                     |                     |  |
| 2PH-160A                | 2 Phase unit 160A  |                         |  |  |                     |                     |  |
| 2PH-250A                | 2 Phase unit 250A  |                         |  |  |                     |                     |  |
| 2PH-400A                | 2 Phase unit 400A  |                         |  |  |                     |                     |  |
| 2PH-500A                | 2 Phase unit 500A  |                         |  |  |                     |                     |  |
| 2PH-630A                | 2 Phase unit 630A  |                         |  |  |                     |                     |  |
| 3PH-50A                 | 3 Phase unit 50A   |                         |  |  |                     |                     |  |
| 3PH-100A                | 3 Phase unit 100A  |                         |  |  |                     |                     |  |
| 3PH-160A                | 3 Phase unit 160A  |                         |  |  |                     |                     |  |
| 3PH-250A                | 3 Phase unit 250A  |                         |  |  |                     |                     |  |
| 3PH-400A                | 3 Phase unit 400A  |                         |  |  |                     |                     |  |
| 3PH-500A                | 3 Phase unit 500A  |                         |  |  |                     |                     |  |
| 3PH-630A                | 3 Phase unit 630A  |                         |  |  |                     |                     |  |
| 4PH-50A                 | 4 Phase unit 50A   |                         |  |  |                     |                     |  |
| 4PH-100A                | 4 Phase unit 100A  |                         |  |  |                     |                     |  |
| 4PH-160A                | 4 Phase unit 160A  |                         |  |  |                     |                     |  |
| 4PH-250A                | 4 Phase unit 250A  |                         |  |  |                     |                     |  |
| 4PH-400A                | 4 Phase unit 400A  |                         |  |  |                     |                     |  |
| 4PH-500A                | 4 Phase unit 500A  |                         |  |  |                     |                     |  |
| 4PH-630A                | 4 Phase unit 630A  |                         |  |  |                     |                     |  |
| PWR-50A                 | 50A Power module   |                         |  |  |                     |                     |  |
| PWR-100A                | 100A Power module  |                         |  |  |                     |                     |  |
| PWR-160A                | 160A Power module  |                         |  |  |                     |                     |  |
| PWR-250A                | 250A Power module  |                         |  |  |                     |                     |  |
| PWR-400A                | 400A Power module  |                         |  |  |                     |                     |  |
| PWR-500A                | 500A Power module  |                         |  |  |                     |                     |  |
| PWR-630A                | 630A Power module  |                         |  |  |                     |                     |  |
| DRV-XXX                 | Driver module only |                         |  |  |                     |                     |  |

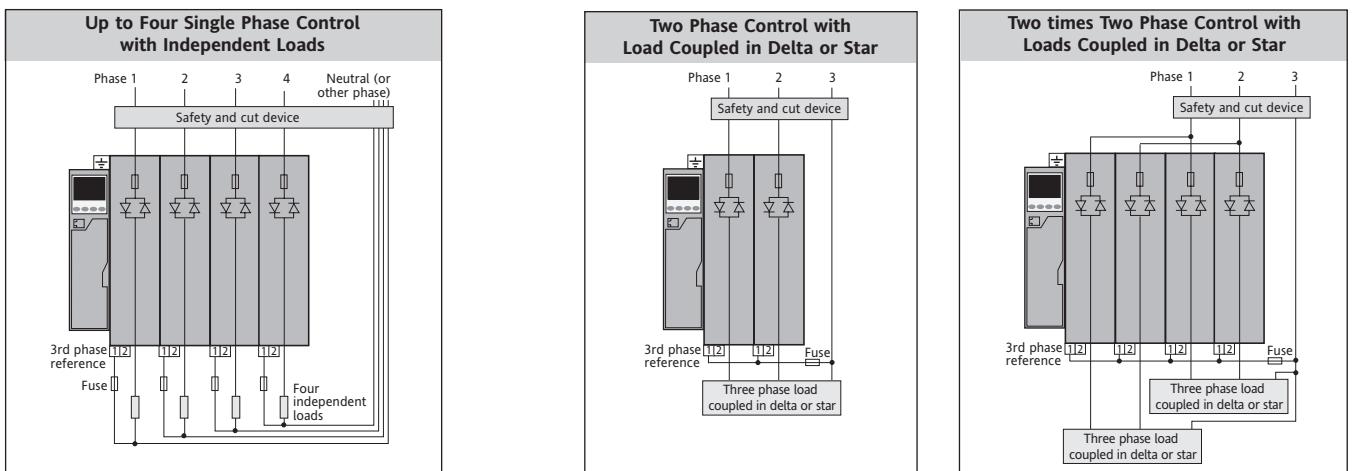
## General diagrams

### Caution

1. Neutral/phase reference connections (if applicable) must be located between any isolating device and the relevant Power Module.
2. For single phase configurations, all Neutral reference connections must be individually fused.



|              |   |           |  |           |                                 |                                     |  |
|--------------|---|-----------|--|-----------|---------------------------------|-------------------------------------|--|
| <b>20</b>    | <b>Load Current (nominal)</b>   | <b>25</b> | <b>Firing Mode (Note 5)</b>                                  | <b>31</b> | <b>Analogue Input 2 Type</b>    | <b>36</b>                           | <b>Load Management Configuration</b>                             |
| 16A          | 16 Amps   | PA        | Phase angle  | XX        | None                            | XX                                  | None – Load Management disabled                                  |
| 25A          | 25 Amps   | HC        | Half cycle   | 0V        | 0-10 Volt                       | SH                                  | Sharing  |
| 40A          | 40 Amps   | BF        | Burst firing<br>(default 16 cycles)                          | 1V        | 1-5 Volt                        | I1                                  | Incremental Type 1   |
| 50A          | 50 Amps   | FX        | Fix modulation period<br>(default 2 seconds)                 | 2V        | 2-10 Volt                       | I2                                  | Incremental Type 2   |
| 63A          | 63 Amps   | LG        | Logic mode   | 5V        | 0-5 Volt                        | RI                                  | Rotating Incremental   |
| 80A          | 80 Amps   |           |  | 0A        | 0-20 mA                         | DC                                  | Distributed Control  |
| 100A         | 100 Amps  |           |  | 4A        | 4-20 mA                         | DI                                  | Distributed Control and Incremental Control                      |
| 125A         | 125 Amps (Note 1)   |           |  |           |                                 | RD                                  | Rotating Distributed Control and Incremental Control             |
| 160A         | 160 Amps (Note 1)   |           |  |           |                                 |                                     |  |
| 200A         | 200 Amps (Note 1)   |           |  |           |                                 |                                     |  |
| 250A         | 250 Amps (Note 1)   |           |  |           |                                 |                                     |  |
| 315A         | 315 Amps (Note 1)   |           |  |           |                                 |                                     |  |
| 400A         | 400 Amps (Note 1)   |           |  |           |                                 |                                     |  |
| 500A         | 500 Amps (Note 1)   |           |  |           |                                 |                                     |  |
| 630A         | 630 Amps (Note 1)   |           |  |           |                                 |                                     |  |
| <b>21</b>    | <b>Load Voltage (nominal)</b>   | <b>26</b> | <b>Feedback</b>  | <b>32</b> | <b>Analogue Output Function</b> | <b>37</b>                           | <b>Predictive Load Management Address</b>                        |
| 100V         | 100 Volts   | V2        | RMS load voltage squared                                     | XX        | None                            | XX                                  | Predictive Load Management address (00 to 63) Default address 00 |
| 110V         | 110 Volts   | I2        | RMS load current squared                                     | X         | None                            |                                     |  |
| 115V         | 115 Volts   | TP        | True power   | V         | Voltage                         |                                     |  |
| 120V         | 120 Volts   | VR        | RMS load voltage   | I         | Current                         |                                     |  |
| 127V         | 127 Volts   | IR        | RMS load current   | P         | Power                           |                                     |  |
| 200V         | 200 Volts   | OL        | Open loop  | R         | Impedance                       |                                     |  |
| 208V         | 208 Volts   |           |  |           |                                 |                                     |  |
| 220V         | 220 Volts   |           |  |           |                                 |                                     |  |
| 230V         | 230 Volts   |           |  |           |                                 |                                     |  |
| 240V         | 240 Volts   |           |  |           |                                 |                                     |  |
| 277V         | 277 Volts   |           |  |           |                                 |                                     |  |
| 380V         | 380 Volts   |           |  |           |                                 |                                     |  |
| 400V         | 400 Volts   |           |  |           |                                 |                                     |  |
| 415V         | 415 Volts   |           |  |           |                                 |                                     |  |
| 440V         | 440 Volts   |           |  |           |                                 |                                     |  |
| 460V         | 460 Volts   |           |  |           |                                 |                                     |  |
| 480V         | 480 Volts   |           |  |           |                                 |                                     |  |
| 500V         | 500 Volts   |           |  |           |                                 |                                     |  |
| 575V         | 575 Volts   |           |  |           |                                 |                                     |  |
| 600V         | 600 Volts   |           |  |           |                                 |                                     |  |
| 660V         | 660 Volts (Note 2)  |           |  |           |                                 |                                     |  |
| 690V         | 690 Volts (Note 2)  |           |  |           |                                 |                                     |  |
| <b>22</b>    | <b>Control Type (Note 3)</b>  | <b>27</b> | <b>Current Transfer Mode (Linear Current Limit) (Note 6)</b> | <b>33</b> | <b>Analogue Output Type</b>     | <b>SPARE FUSE FOR POWER MODULES</b> |  |
| 1P           | Single phase  | XXX       | Off  | XX        | None                            | <b>Current rating amps</b>          | <b>Fuse number</b>   |
| 2P           | Two phase control   | I2        | RMS load current squared transfer                            | 0V        | 0-10 Volt                       | 50A                                 | CS179139U315   |
| 3P           | Three phase control   | IR        | RMS load current transfer                                    | 1V        | 1-5 Volt                        | 100A                                | CS179139U315   |
| <b>23</b>    | <b>Load Configuration (Note 4)</b>  |           |  | 2V        | 2-10 Volt                       | 160A                                | CS179139U315   |
| 1P           | Single phase  |           |  | 5V        | 0-5 Volt                        | 250A                                | CS179139U350   |
| 3S           | Star  |           |  | 0A        | 0-20 mA                         | 400A                                | CS179439U550   |
| 3D           | Delta   |           |  | 4A        | 4-20 mA                         | 500A                                | CS029859U630   |
| 4S           | Star with neutral   |           |  |           |                                 | 630A                                | CS029960U900   |
| 6D           | Open delta  |           |  |           |                                 |                                     |  |
| <b>24</b>    | <b>Load Type</b>  | <b>28</b> | <b>Analogue Input 1 Function (Note 6)</b>                    | <b>34</b> | <b>Digital Input 2 Function</b> |                                     |  |
| XX           | Resistive   | XX        | None   | XX        | None                            |                                     |  |
| TR           | Transformer primary   | SP        | Setpoint   | AK        | Alarm acknowledgement           |                                     |  |
|              |   | HR        | Setpoint limit   | RS        | Remote setpoint selection       |                                     |  |
|              |   | IL        | Current limit  |           |                                 |                                     |  |
|              |   | VL        | Voltage limit  |           |                                 |                                     |  |
|              |   | PL        | Power limit  |           |                                 |                                     |  |
|              |   | TS        | Current transfer span  |           |                                 |                                     |  |
| <b>29</b>    | <b>Analogue Input 1 Type</b>  | <b>35</b> | <b>Alarm Relay Configuration</b>                             |           |                                 |                                     |  |
| XX           | None  | XX        | None   |           |                                 |                                     |  |
| 1V           | 1-5 Volt  | AA        | Any alarm  |           |                                 |                                     |  |
| 2V           | 2-10 Volt   | PA        | Process alarms   |           |                                 |                                     |  |
| 5V           | 0-5 Volt  | FB        | Fuse blown   |           |                                 |                                     |  |
| 0A           | 0-20 mA   |           |  |           |                                 |                                     |  |
| 4A           | 4-20 mA   |           |  |           |                                 |                                     |  |
| <b>30</b>    | <b>Analogue Input 2 Function (Note 6)</b>   |           |  |           |                                 |                                     |  |
| XX           | None  |           |  |           |                                 |                                     |  |
| SP           | Setpoint  |           |  |           |                                 |                                     |  |
| HR           | Setpoint limit  |           |  |           |                                 |                                     |  |
| IL           | Current limit   |           |  |           |                                 |                                     |  |
| VL           | Voltage limit   |           |  |           |                                 |                                     |  |
| PL           | Power limit   |           |  |           |                                 |                                     |  |
| TS           | Current transfer span   |           |  |           |                                 |                                     |  |
| <b>Notes</b> |   |           |  |           |                                 |                                     |  |
| 1.           | The maximum nominal current selectable is the current rating selected in Field 1.   |           |  |           |                                 |                                     |  |
| 2.           | Only available if 690V selected in Field 2.   |           |  |           |                                 |                                     |  |
| 3.           | Selection dependent on number of Phases selected in Field 1.<br>1PH = IP only<br>2PH = IP or 2P only<br>3PH = IP or 3P only<br>4PH = IP or 2P only  |           |  |           |                                 |                                     |  |
| 4.           | Selection dependent on number of Phases selected in Field 1.<br>1PH = IP only<br>2PH = IP, 3S or 3D only<br>3PH = Any<br>4PH = IP, 3S or 3D only<br>If IP selected in Field 22 only option is IP. |           |  |           |                                 |                                     |  |
| 5.           | PA not selectable if 2P selected in Field 22.<br>HC not selectable if TR selected in Field 24.  |           |  |           |                                 |                                     |  |
| 6.           | Except XX the selection in Fields 28 and 30 cannot be the same.   |           |  |           |                                 |                                     |  |



# 32h8e EPower Remote Panel



Model number 32h8e is a horizontal 1/8DIN indicator and alarm unit that performs the dual function of remote display for EPower and independent 'policeman'. The latter is intended to disconnect should an overtemperature (or other excess process condition) occur. 32h8e communicates with EPower using Modbus protocol via the EIA485 RJ45 connector located on the underside of the EPower controller.

The remote panel is normally ordered as an option with EPower units. It is a fixed hardware build consisting of a relay output in OP1 and an analogue output in OP3. There are no user communications since this is used to communicate with EPower and the supply is high voltage only (100-240Vac). The unit is configured using 'QuickStart' code on initial start up.

The 32h8e is based on a 32h8i indicator and has the same and additional features as this instrument. For features not covered please refer to HA029005.

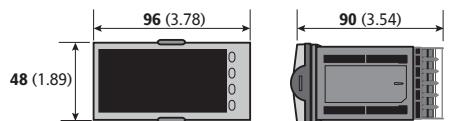
The 32h8e displays EPower Current, Voltage, Power and Setpoint parameters for each EPower Network. The Setpoint of the EPower networks can be adjusted via the 32h8e HMI. Indication of selected setpoint is included: local or remote.

## Wire sizes

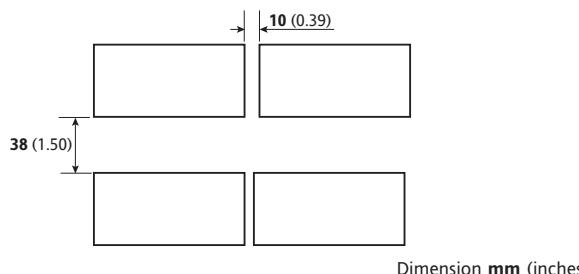
The screw terminals accept wire sizes from 0.5 to 1.5mm (16 to 22AWG). Hinged covers prevent hands or metal making accidental contact with live wires. The rear screws should be tightened to 0.4Nm (3.3lb in).

Ensure that the supply to the unit does not exceed 240Vac +10%

## Mechanical Details



Panel cut-out 45 (1.77) (-0.0 +0.6) x 92 (3.62) (-0.0 +0.8)

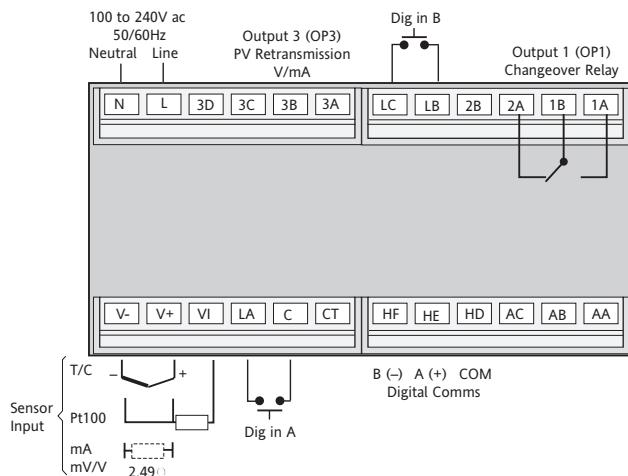


Dimension mm (inches)

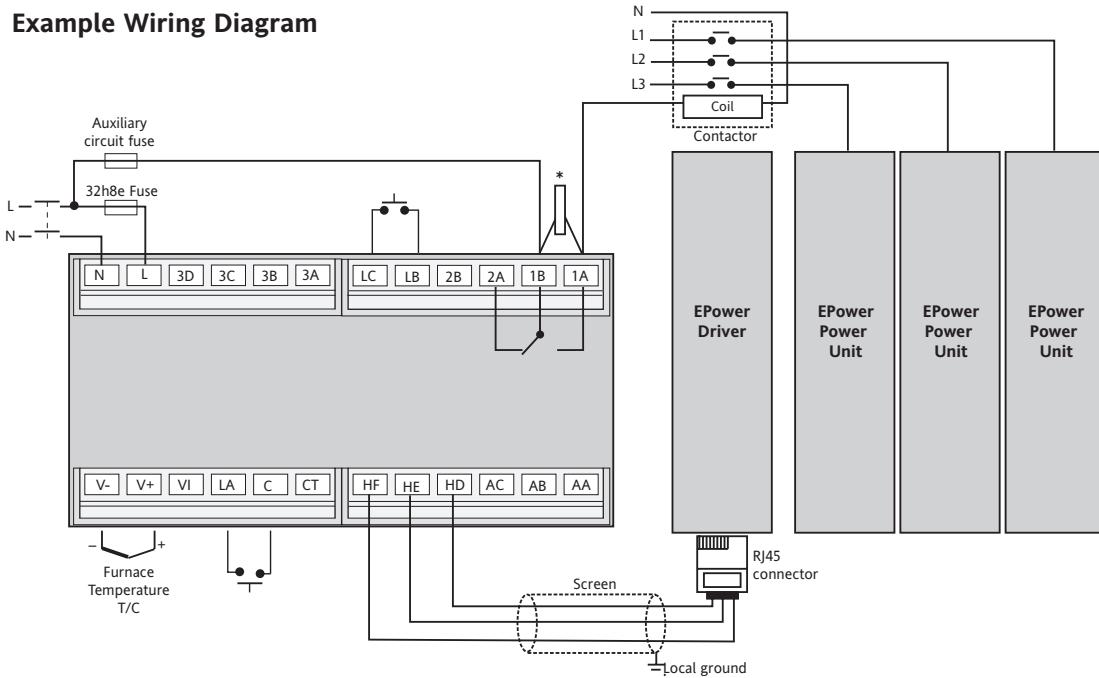
## Recommended minimum spacing

If more than one unit is mounted in the same panel they should be spaced to allow sufficient air flow between them.

## Rear Terminals



## Example Wiring Diagram



### \* General notes about relays and Inductive Loads

When switching inductive loads such as contactors or solenoid valves, wire the 22nF/100 'snubber' supplied across normally open relay terminals.

This will prolong contact life and reduce interference.

Snubbers pass 0.6mA at 110V and 1.2mA at 230Vac, which may be sufficient to hold on high impedance loads.

## Specification - 32h8e Remote display

### Environmental performance

|                    |  |
|--------------------|--|
| Temperature limits | Operation: 0 to 55°C<br>Storage: -10 to 70°C                                 |
| Humidity limits    | Operation: 5 to 85% RH non condensing<br>Storage: 5 to 85% RH non condensing |
| Panel sealing:     | IP65, Nema 4X  |
| Shock:             | BS EN61010   |
| Vibration:         | 2g peak, 10 to 150Hz   |
| Altitude:          | <2000 metres   |
| Atmospheres:       | Not suitable for use in explosive or corrosive atmosphere                    |

### Electromagnetic compatibility (EMC)

|                         |            |
|-------------------------|------------|
| Emissions and immunity: | BS EN61326 |
|-------------------------|------------|

### Electrical safety

|               |  |
|---------------|--|
| (BS EN61010): | Installation cat. II; Pollution degree 2 |
|---------------|--|

#### INSTALLATION CATEGORY II

The rate impulse voltage for equipment on nominal 230V mains is 2500V.

#### POLLUTION DEGREE 2

Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation shall be expected

### Physical

|                           |  |
|---------------------------|--|
| Panel mounting:           | 1/8 DIN, horizontal  |
| Dimensions and weight:    | 96mm (3.78") W x 48mm (1.89") H x 90mm (3.54 inches) D, 350g (0.77lbs) |
| Panel cut-out dimensions: | 92mm (1.77 inches) W x 45mm (3.62 inches) H                            |

### Operator interface

|                  |                              |
|------------------|------------------------------|
| Type:            | LCD TN with backlight        |
| Main PV display: | 5 digits, green or red       |
| Lower display:   | 9 character starburst, green |
| Status beacons:  | Units, outputs, alarms       |

### Power requirements

|            |                                    |
|------------|------------------------------------|
| Voltage:   | 100 to 240V ac, -15%, +10%, max 9W |
| Frequency: | 48 to 62Hz                         |

### Approvals

CE, cUL listed (file E57766)

## Communications

### Serial communications option

|                        |                           |
|------------------------|---------------------------|
| Protocol:              | Modbus RTU Master         |
| Isolation:             | 264V ac, double insulated |
| Transmission standard: | EIA485 (2 wire)           |

The 32h8e has Modbus Master RS485 Comms with a fixed set of EPower Modbus addresses. Power up the display for the first time, configure the QuickStart code for the standard indicator functions, and the process values and alarm messages are immediately displayed, automatically configured to match the EPower display - for example RMS values or average values for current, voltage and power displayed as 3 phase or as several times single phase as defined by the EPower configuration.

| 32h8e Terminal |              | RJ45 Pin Number |
|----------------|--------------|-----------------|
| HD             | White/Green  | Common          |
| HE             | Orange       | Rx A(+)         |
| HF             | White/Orange | Tx B(-)         |

## Process variable input

|                               |  |
|-------------------------------|--|
| Calibration accuracy:         | <±0.25% of reading ±1LSD (Note 1)  |
| Sample rate:                  | 9Hz(110ms)   |
| Isolation:                    | 264V ac double insulation from the PSU and communication                     |
| Resolution (µV):              | <0.5µV with 1.6s filter (mV range)<br><0.25mV with 1.6s filter (Volts range) |
| Resolution (effective bits):  | >17 bits   |
| Linearity accuracy:           | < 0.1% of reading  |
| Drift with temperature:       | <50ppm (typical) <100ppm (worst case)  |
| Common mode rejection:        | 48-62Hz, >-120db   |
| Series mode rejection:        | 48-62Hz, >-93dB  |
| Input impedance:              | 100MΩ (200KΩ on volts range C)   |
| Cold junction compensation:   | >30/1 rejection of ambient change  |
| External cold junction:       | Reference of 0°C   |
| Cold junction accuracy:       | <±1°C at 25°C ambient  |
| Linear (process) input range: | -10 to 80mV, 0 to 10V  |
| Thermocouple types:           | K, J, N, R, S, B, L, T, C, custom download (Note 2)                          |

Resistance thermometer types: 3-wire Pt100 DIN 43760

Bulb current: 0.2mA

Lead compensation: No error for 22 ohms in all leads

Input filter: Off to 100s

Zero offset: User adjustable over full range

User calibration: 2-point gain & offset

### Notes

- (1) Calibration accuracy quoted over full ambient operating range and for all input linearisation types
- (2) Contact Eurotherm for details of availability of custom downloads for alternative sensors

## OP 1

|            |  |
|------------|--|
| Type:      | Form C (changeover)                        |
| Rating:    | Min 100mA @12V dc, max 2A@240Vac resistive |
| Functions: | Alarms, events                             |

## OP 3

|                |                              |
|----------------|------------------------------|
| Isolation:     | 264V ac double insulated     |
| Functions:     | Retransmission               |
| Current output |                              |
| Rating:        | 0-20mA into <500Ω            |
| Accuracy:      | ±(<0.25% of Reading + <50µA) |
| Resolution:    | 13.6 bits                    |
| Voltage output |                              |
| Rating:        | 0-10V into >500Ω             |
| Accuracy:      | ±(<0.25% of Reading +<25mV)  |
| Resolution:    | 13.6 bits                    |

## Software features

### Alarms

|                    |  |
|--------------------|--|
| Number:            | 4  |
| Type:              | Absolute high & low, Rate of change (rising or falling)  |
| Latching:          | Auto or manual latching, non-latching, event only  |
| Output assignment: | Up to four conditions can be assigned to one output  |
| EPower Alarms:     | Missing mains, Thyristor short circuit, Open thyristor, Fuse blown, Over temperature, Voltage dips, Frequency fault, Power module 24V fault, Total load failure, Chop off, Partial Load Failure, Partial Load Unbalance, Volt fault, Temperature pre alarm, Power module wdog fault, Power module comms error, Power module timeout, Closed loop, Output fault |

The pre-set alarms have a fixed medium priority enables indicator alarms to be configured as lower, the same or higher priority.  
EPower alarms can be globally acknowledged via the 32h8e HMI.

### Other status outputs

|                    |  |
|--------------------|--|
| Functions:         | Including sensor break, power fail, new alarm, pre-alarm |
| Output assignment: | Up to four conditions can be assigned to one output      |

### Custom messages

|                   |  |
|-------------------|--|
| Number:           | 15 scrolling text messages                               |
| No of characters: | 127 characters per message max                           |
| Languages:        | English, German, French, Spanish, Italian                |
| Selection:        | Active on any parameter status using conditional command |

### Recipes

|            |   |
|------------|---|
| Number:    | 5 recipes with 19 parameters                |
| Selection: | HMI interface, communications or digital IO |

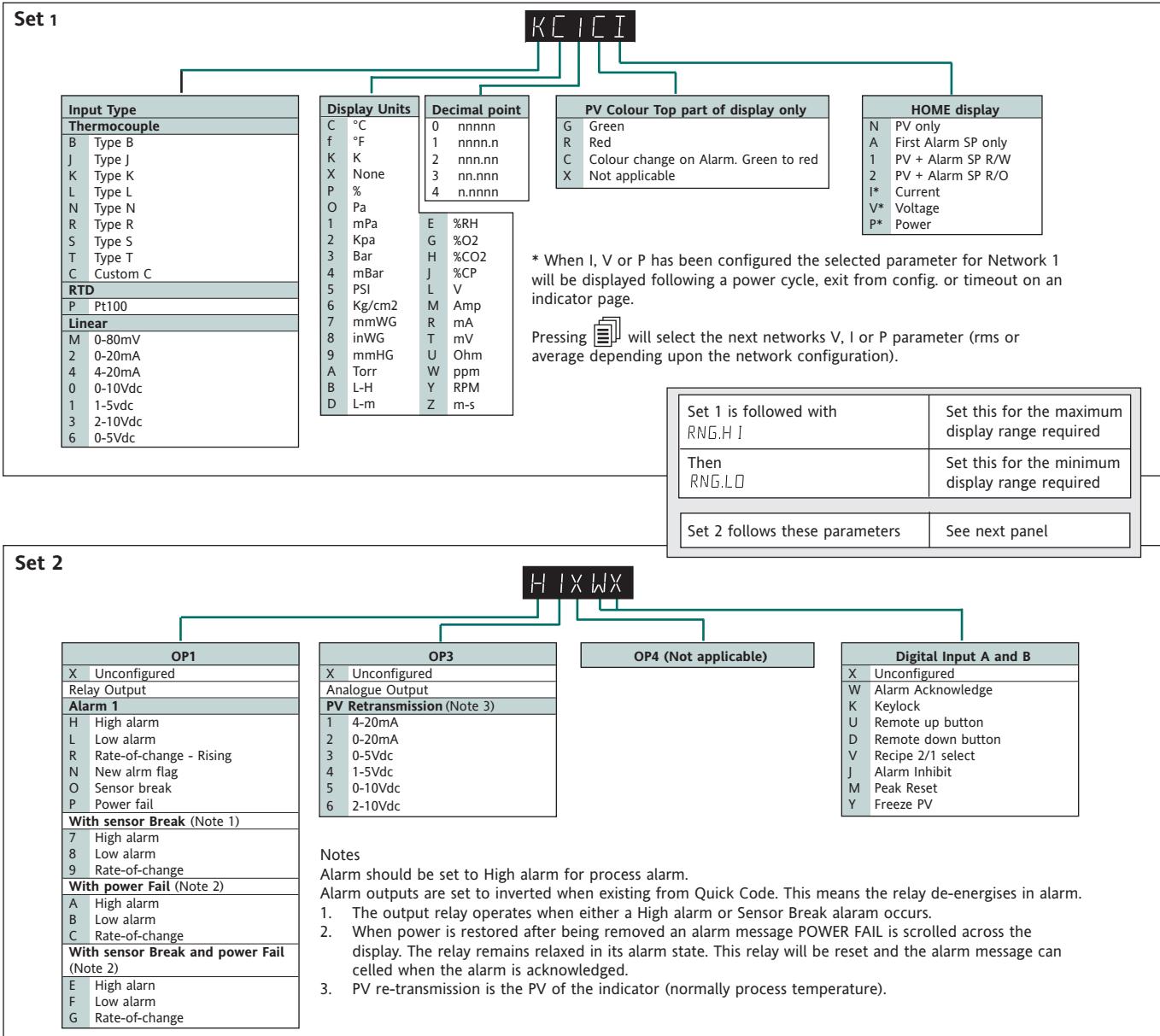
### Other features

|                 |  |
|-----------------|--|
| Display colour: | Upper display selectable green or red or change on alarm |
| Scrolling text: | Parameter help, custom messages                          |
| Display filter: | Off to zero last 2 digits                                |
| Peak monitor:   | Stores high and low values                               |

## 32h8e Initial configuration

If it has not previously been configured (e.g. a new instrument) it will start up showing the 'QuickStart' configuration codes.

This consists of two 'Sets' of five characters. The upper section of the display shows the set selected, the lower section shows the five which make up the set.



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